

The Listing of Claims will replace all prior versions, and listings, of claims in the application.

Claims 1 – 19. (Canceled)

Claim 20. (Omitted and Never Presented)

Claims 21- 44. (Canceled)

Claim 45. (Previously presented) A process for preparing a pre-graphitic carbonaceous host for a carbonaceous insertion compound comprising pyrolyzing an epoxy precursor, or a phenolic resin precursor, or a carbohydrate precursor or a carbohydrate containing precursor at a temperature above 800°C, and within a temperature range effective to produce an H/C atomic ratio less than about 0.1 and an empirical parameter R for said host wherein R:

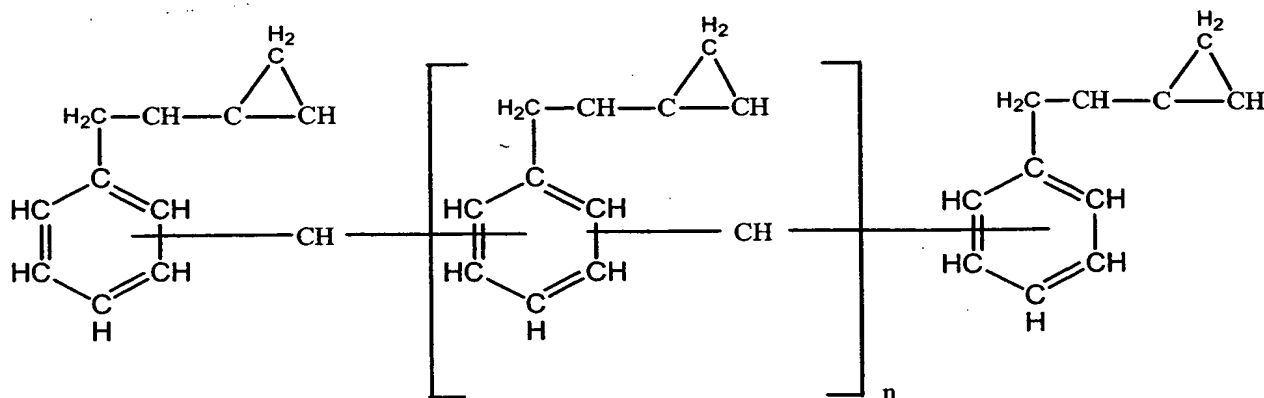
(i) is determined by X-ray diffraction using a diffractometer equipped with a copper target X-ray tube and a diffractive beam monochromometer, with the X-ray beam of said diffractometer being confined to the sample in the angular range from 10° to 35° in scattering angle,

(ii) is defined as the {002} peak divided by the background level, and

(iii) is less than about 2.2.

Claim 46. (Currently Amended) A process as claimed in claim [[44]] 45, comprising pyrolyzing an epoxy precursor.

Claim 47. (Currently Amended) A process as claimed in claim [[45]] 46, wherein the epoxy precursor is an epoxy novolac resin with formula

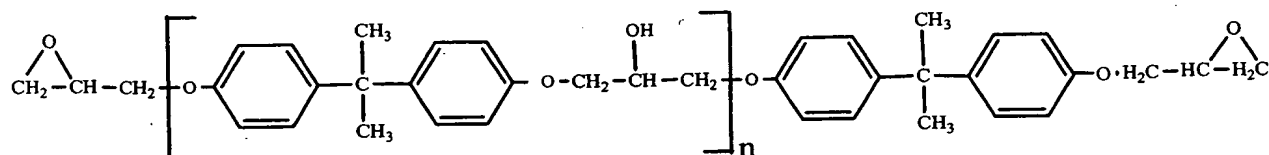


Epoxy Novolac Resin

$n = 1.6$

and the pyrolysis is performed at a maximum temperature below about 1100°C.

Claim 48. (Currently Amended) A process as claimed in claim [[45]] 46, wherein the epoxy precursor is ~~abisphenol~~ a bisphenol A epoxy resin with formula



Bisphenol-A Epoxy Resin

$n = 12$

and the pyrolysis is performed at a temperature about 800°C.

Claim 49. (Currently Amended) A process as claimed in claim [[44]] 45, comprising pyrolyzing a phenolic resin precursor.

Claim 50. (Currently Amended) A process as claimed in claim [[48]] 49, wherein the phenolic resin precursor is of the novolac type.

Claim 51. (Currently Amended) A process as claimed in claim [[48]] 49, wherein the phenolic resin precursor is of the resole type.

Claim 52. (Currently Amended) A process as claimed in claim 51, wherein the pyrolysis is performed at a temperature in the range from about 900°C to about 1100°C.

Claim 53. (Currently Amended) A process as claimed in claim 45, comprising pyrolyzing a carbohydrate precursor or a carbohydrate containing precursor.

Claim 54. (Currently Amended) A process as claimed in claim 53, wherein the carbohydrate precursor is selected from the group consisting of sugar, starch, and cellulose.

Claim 55. (Currently Amended) A process as claimed in claim 53, additionally comprising precarbonizing the carbohydrate by washing with an acid.

Claim 56. (Currently Amended) A process as claimed in claim 55, wherein the carbohydrate is sucrose.

Claim 57. (Currently Amended) A process as claimed in claim 55, wherein the acid is concentrated sulfuric acid.

Claims 58 – 60. (Canceled)

Claim 61. (Currently Amended) An electrochemical device comprising an electrode, wherein at least a portion of said electrode comprises a carbonaceous insertion compound, said carbonaceous insertion compound comprising: a pre-graphitic carbonaceous host prepared by the method of claim 45; and atoms of an alkali metal inserted into the carbonaceous host.

Claim 62. (Currently Amended) An electrochemical device as claimed in claim 61 61, wherein said carbonaceous insertion compound comprises a pre-graphitic carbonaceous host prepared by pyrolyzing an epoxy precursor.

Claim 63. (Currently Amended) An electrochemical device as claimed in claim 62,  
[[61]] wherein the epoxy precursor is a novolac epoxy resin.

Claim 64. (Currently Amended) An electrochemical device as claimed in claim 62,  
[[61]] wherein the epoxy precursor is a bisphenol A epoxy resin.

Claim 65. (Currently Amended) An electrochemical device as claimed in claim 61  
[[60]], wherein said carbonaceous insertion compound comprises a pre-graphitic  
carbonaceous host prepared by pyrolyzing a phenolic resin precursor.

Claim 66. (Currently Amended) An electrochemical device as claimed in claim 65,  
[[64]] wherein the phenolic resin precursor is of the novolac type.

Claim 67. (Currently Amended) An electrochemical device as claimed in claim 65,  
[[64]] wherein the phenolic resin precursor is of the resole type.

Claim 68. (Currently Amended) An electrochemical device as claimed in claim 61  
[[60]], wherein said carbonaceous insertion compound comprises a pre-graphitic  
carbonaceous host prepared by pyrolyzing a carbohydrate precursor or a carbohydrate  
containing precursor.

Claim 69. (Currently Amended) An electrochemical device as claimed in claim 68,  
[[67]] wherein the carbohydrate precursor is selected from the group consisting of sugar,  
starch, and cellulose.

Claim 70. (Canceled)

Claim 71. (Previously Presented) An electrochemical device comprising an electrode  
wherein at least a portion of the electrode comprises a carbonaceous insertion compound  
comprising:

- (a) a pre-graphitic carbonaceous host having a reversible capacity for lithium insertion, an irreversible capacity for lithium insertion, and a surface area accessible to a non-aqueous electrolyte wherein
- (i) the empirical parameter R for said carbonaceous insertion compound:
    - (A) is, determined by X-ray diffraction using a diffractometer equipped with a copper target X-ray tube and a diffracted beam monochromometer, with the X-ray beam of said diffractometer being confined to the sample in the angular range from 10° to 35° in scattering angle,
    - (B) is defined as the height of the centre of the {002} peak divided by the background level, and
    - (C) is less than about 2.2;
  - (ii) the H/C atomic ratio is less than about 0.1; and
  - (iii) the electrolyte accessible surface area is sufficiently small such that the irreversible capacity is less than about a half that of the reversible capacity;
- (b) and alkali metal atoms reversibly inserted into the carbonaceous host in an amount greater than that which can be reversibly inserted into graphite.

Claim 72. (Previously Presented) An electrochemical device according to claim 71, wherein the alkali metal is lithium.

Claim 73. (Previously Presented) A battery comprising an electrode wherein a portion of the electrode comprises a carbonaceous insertion compound comprising:

- (a) a pre-graphitic carbonaceous host having a reversible capacity for lithium insertion, an irreversible capacity for lithium insertion, and a surface area accessible to a non-aqueous electrolyte wherein
- (i) the empirical parameter R for said carbonaceous insertion compound:
    - (A) is, determined by X-ray diffraction using a diffractometer equipped with a copper target X-ray tube and a diffracted beam monochromometer, with the X-ray beam of said diffractometer being

confined to the sample in the angular range from  $10^{\circ}$  to  $35^{\circ}$   
in scattering angle,

(B) is defined as the height of the centre of the {002} peak divided by  
the background level, and

(C) is less than about 2.2;

(ii) the H/C atomic ratio is less than about 0.1; and

(iii) the electrolyte accessible surface area is sufficiently small such that  
the irreversible capacity is less than about a half that of the reversible  
capacity;

(b) and alkali metal atoms reversibly inserted into the carbonaceous host in an  
amount greater than that which can be reversibly inserted into graphite.

Claim 74. (Previously Presented) A battery according to claim 73, wherein the alkali  
metal is lithium.

Claim 75. (Currently Amended) A battery comprising an electrode wherein a portion  
of the electrode comprises a carbonaceous insertion compound prepared according to the  
process of claim [[44]] 45.

Claim 76. (Previously Presented) A battery as claimed in claim 75, wherein a portion  
of the electrode comprises a carbonaceous insertion compound prepared by pyrolyzing an  
epoxy precursor compound comprising an epoxy novolac resin.

Claim 77. (Previously Presented) A battery as claimed in claim 75, wherein a portion  
of the electrode comprises a carbonaceous insertion compound prepared by pyrolyzing an  
epoxy precursor compound comprising a Bisphenol A epoxy resin.

Claim 78. (Currently Amended) A battery comprising an electrode wherein a portion  
of the electrode comprises a carbonaceous insertion compound prepared by the process of  
claim [[48]] 49.

Claim 79. (Currently Amended) A battery comprising an electrode wherein a portion of the electrode comprises a carbonaceous insertion compound prepared by the process of claim [[52]] 53.

Claim 80. (Previously Presented) A non-aqueous battery comprising: a cathode comprising a lithium insertion compound; a non-aqueous electrolyte comprising a lithium salt dissolved in a mixture of non-aqueous solvents; and an anode comprising a carbonaceous insertion compound comprising:

(a) a pre-graphitic carbonaceous host having a reversible capacity for lithium insertion, an irreversible capacity for lithium insertion, and a surface area accessible to a non-aqueous electrolyte wherein

- (i) the empirical parameter R for said carbonaceous insertion compound:
  - (A) is, determined by X-ray diffraction using a diffractometer equipped with a copper target X-ray tube and a diffracted beam monochromator, with the X-ray beam of said diffractometer being confined to the sample in the angular range from 10° to 35° in scattering angle,
  - (B) is defined as the height of the centre of the {002} peak divided by the background level, and
  - (C) is less than about 2.2;
- (ii) the H/C atomic ratio is less than about 0.1; and
- (iii) the electrolyte accessible surface area is sufficiently small such that the irreversible capacity is less than about a half that of the reversible capacity;

(b) and lithium atoms reversibly inserted into the carbonaceous host in an amount greater than that which can be reversibly inserted into graphite.

Claim 81. (Currently Amended) A non-aqueous battery comprising: a cathode comprising a lithium insertion compound; a non-aqueous electrolyte comprising a lithium salt dissolved in a mixture of non-aqueous solvents; and an anode comprising a carbonaceous insertion compound prepared by the process of claim [[44]] 45, wherein the alkali metal is Li.

Claim 82. (Previously Presented) A non-aqueous battery as claimed in claim 81 comprising: a cathode comprising a lithium insertion compound; a non-aqueous electrolyte comprising a lithium salt dissolved in a mixture of non-aqueous solvents; and an anode comprising a carbonaceous insertion compound prepared by pyrolyzing an epoxy precursor compound comprising a novolac resin.

Claim 83. (Previously Presented) A non-aqueous battery as claimed in claim 81 comprising: a cathode comprising a lithium insertion compound; a non-aqueous electrolyte comprising a lithium salt dissolved in a mixture of non-aqueous solvents; and an anode comprising a carbonaceous insertion compound prepared by pyrolyzing an epoxy precursor compound comprising an epoxy novolac resin.

Claim 84. (Currently Amended) A non-aqueous battery comprising: a cathode comprising a lithium insertion compound; a non-aqueous electrolyte comprising a lithium salt dissolved in a mixture of non-aqueous solvents; and an anode comprising a carbonaceous insertion compound prepared by the process of claim [[48]] 49.

Claim 85. (Currently Amended) A non-aqueous battery comprising: a cathode comprising a lithium insertion compound; a non-aqueous electrolyte comprising a lithium salt dissolved in a mixture of non-aqueous solvents; and an anode comprising a carbonaceous insertion compound prepared by the process of claim [[52]] 53.

Claim 86. (Currently Amended) The electrochemical device as claimed in claim 63, [[62]] wherein the alkali metal is lithium and the electrochemical device is a non-aqueous battery, the battery comprising a cathode comprising a lithium insertion compound; a non-aqueous battery electrolyte comprising a lithium salt dissolved in a mixture of non-aqueous solvents; and an anode comprising said carbonaceous insertion compound.

Claim 87. (Currently Amended) The electrochemical device as claimed in claim 66, [[65]] wherein the alkali metal is lithium and the electrochemical device is a non-aqueous battery, the battery comprising a cathode comprising a lithium insertion compound; a non-



aqueous battery electrolyte comprising a lithium salt dissolved in a mixture of non-aqueous solvents; and an anode comprising said carbonaceous insertion compound.

Claim 88. (Currently Amended) The electrochemical device as claimed in claim 69, [[68]] wherein the alkali metal is lithium and the electrochemical device is a non-aqueous battery, the battery comprising a cathode comprising a lithium insertion compound; a non-aqueous battery electrolyte comprising a lithium salt dissolved in a mixture of non-aqueous solvents; and an anode comprising said carbonaceous insertion compound.